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The following letters were read by Dr. Johnstone Stoney at the meeting of the Society on 1896 December 11 :—

Quinta Cuibem, Caminho do Til, Funchal, Madeira :
1896 November 27.

Dear Sir,—In accordance with the request contained in the circular which you issued through the Royal Astronomical Society last July, I kept a watch upon the *Leonids* on the morning of the 14th inst., and immediately sent my observations to the journal of the British Astronomical Association, thinking that they would be in time for the November number of that paper, in which I expected you would probably see them. I find, however, that they were not in time for that number of the journal, and so I now venture to send them to yourself in case they may be of some use.

As I have not had experience in the charting of meteors, I did not attempt to map them, especially since you have pointed out in the November number of the *Observatory* that photography is the only satisfactory method for determining the radiant-point. I have no means of photographing the meteors here, and therefore confined myself to counting them and noting the times of their appearance, together with the directions of their flight (roughly), since it might perhaps assist in identifying a particular meteor. I kept an almost constant watch from G.M.T. $2^{h}\ 8^{m}$ until $6^{h}\ 10^{m}$, and the inclosed list contains all the undoubted *Leonids* which I saw, although of twenty-seven other meteors which I noted, several, perhaps four or five, were possible *Leonids*. On account of trees, I had to observe from an upper (open) window of a house, facing south-east, so that I may have missed some meteors which possibly appeared towards the north or north-west ; but I kept a good look-out up to the zenith, and from the north-east round by south to south-west.

Altogether I saw twenty-nine *Leonids*, as given in the list, and the curve given on the back of the latter shows their distribution in periods of half an hour each. There was a rapid increase in their numbers from 4 o'clock until 5.30.

The Earth does not appear to have met with the beginning of the meteor-stream during the period of my watching, but perhaps observers further west have been better rewarded.

Trusting that my notes may be of some use to you,

I am, yours very sincerely,

Wm. Anderson.

G. J. Stoney, Esq., D Sc., F.R.S.

Leonids seen at Madeira on the morning of 1896 November 14.

Greenwich mean times of appearances given. No meteors appeared between $2^{h}\ 8^{m}$ A.M. and $2^{h}\ 38^{m}$.

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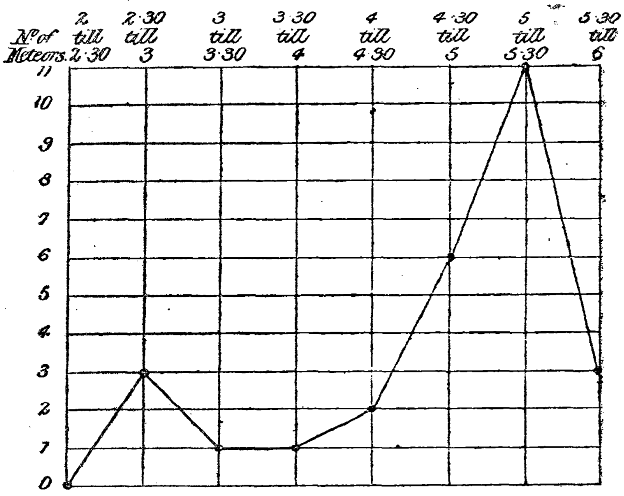
Time.	No. of Meteors.	Direction.	Time.	No. of Meteors.	Direction.
2.38 A.M.	1	Line of sight.	5·4 A.M.	2	S.W.
2.40	1	S.W.	5·6	1	S.W.
2.51	1	S.	5·10	1	N.E.
3·9	1	S.W.	5·14	1	N.E.
3·50	1	S.	5·17	1	N.E.
4·8	1	E.	5·18	1	E.
4·23	1	S.E.	5·20	1	S.E.
4·47	1	E.	5·25	1	S.W.
4·51	1	S.	5·30	1	E.
4·54	1	S.E.	5·44	1	S.W.
4·55	1	S.	5·45	1	N.E.
4·57	1	E.	5·53	1	S.E.
4·59	1	S.W.	6.2	1	S.E.
5·3	1	S.W.	6.6	1	E.



Distribution in time of the foregoing *Leonids*.

c/o Kilburn & Co., Calcutta :
1896 November 18.

Dear Sir,—Re *Leonids*. On November 14 I watched this shower from the time of rising till 16^h Calcutta Local Time (4 A.M. Sunday). Up till 14^h I was only keeping a casual look-out, as I was at my telescope, but till then there were very few meteors visible, and only one bright one from *Leo*.

Between 14^h 30^m and 16^h there were altogether twenty-seven meteors that I saw. Of these twelve came from the *Leonid* radiant, which was as near as I could judge 21° × 152°.

Nine of these twelve were about -1 magnitude, and they were, with exception of two, brilliant yellow with streaks lasting some time. The two exceptions were the brightest of all and

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brilliant purple-white, like an electric arc. These two appeared at $15^h\ 15^m$ and $15^h\ 18^m$.

They came from the direction of the radiant, but being parallel I could not tell whether they belonged to the shower.

Many of the other meteors noticed came from a point in *Leo*, but they were not so bright, and had not lasting streaks.

Yours faithfully,
J. WILLOUGHBY MEARES.

Ephemeris of the Leonids; with Introductory Remarks by G. Johnstone Stoney, M.A., D.Sc., F.R.S.

The *Leonids* are extended in the form of a stream along their orbit, the dense part of the stream being about 100,000 miles across, and of such length that it takes between one and two years—probably nearly two years—to pass each point. It is at present advancing towards perihelion, and is therefore lengthening out.

The following Ephemeris is of that situation in the stream through which the Earth passed in 1866. It has been computed from Adams's "Elements" (*Monthly Notices* of the Royal Astronomical Society for 1867 April, p. 250) by applying to the orbit the mean advance in longitude of its node, but without further taking into account the perturbations which *Jupiter*, *Saturn*, and *Uranus* have impressed upon the orbit since 1866. It was judged to be useless to attempt greater accuracy, since Professor Adams's elements are themselves uncertain within considerable limits, owing to the very discordant determinations of the radiant point which he had to make the starting point of his calculations. In fact the differences between the individual determinations and their mean ranged up to as much as a whole degree in both Right Ascension and Declination.

Nevertheless, it is hoped that the Ephemeris will be sufficient for the use for which it is intended—viz. to enable astronomers to make their first attempt next spring to obtain a photograph of the meteors while at a distance in the open sky. It will be seen from the Ephemeris that next spring they will be nearly as far off as *Saturn*, whose crape ring (formed of bodies separated like the meteors at a distance from one another) is visible at the ansæ, under favourable circumstances, in observations which are mere eye observations, and notwithstanding the close proximity of bright bodies on all sides. It follows that a very much fainter object might be successfully photographed in a dark part of the sky. Any computation, however, which we can make leads to the conclusion that the meteor stream is so excessively faint that we must not be discouraged if our best efforts on this occasion are unsuccessful. It will in that case be desirable to renew the attempt in the spring of 1898, when the stream will have got nearer to the Sun, and will have become brighter under his beams.